Aromatic amides and their use for self-assembly

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Structures of aromatic amides (aramides), as it is known from Kevlar for instance, show high shape persistence on a molecular level. Due to their aromatic backbone, preferred trans-conformation of the amide bonds and its double-bond character, they are constituted as very rigid rods. Using different non-covalent interactions, such as hydrophilic/ hydrophobic ones, hydrogen bonding or π-π stacking, oligomers of these compounds are expected to self-assemble in a well-defined and therefore controllable manner. This makes them interesting candidates for supramolecular materials within the field of soft matter.

So far research concentrated mainly on organo-solubility[1] and only few groups addressed the issue of water solubility[2] or the synthesis of amphiphilic aramides. This project focuses on unusual geometrical structures synthesized from *para*-aminobenzoic acid building blocks, which are commonly used for aramides. For more complex structures (such as in figure 1) self-assembly of these compounds is no longer trivial. Herein we present the synthesis of two unusual geometries, consisting of hydrophobic and hydrophilic p-aminobenzoic acid derivatives. These structures only differ in one functional group, but already exhibit different self-assembly into nano-scopic objects as investigated via transmission electron microscopy (TEM) and dynamic light scattering (DLS).

Figures

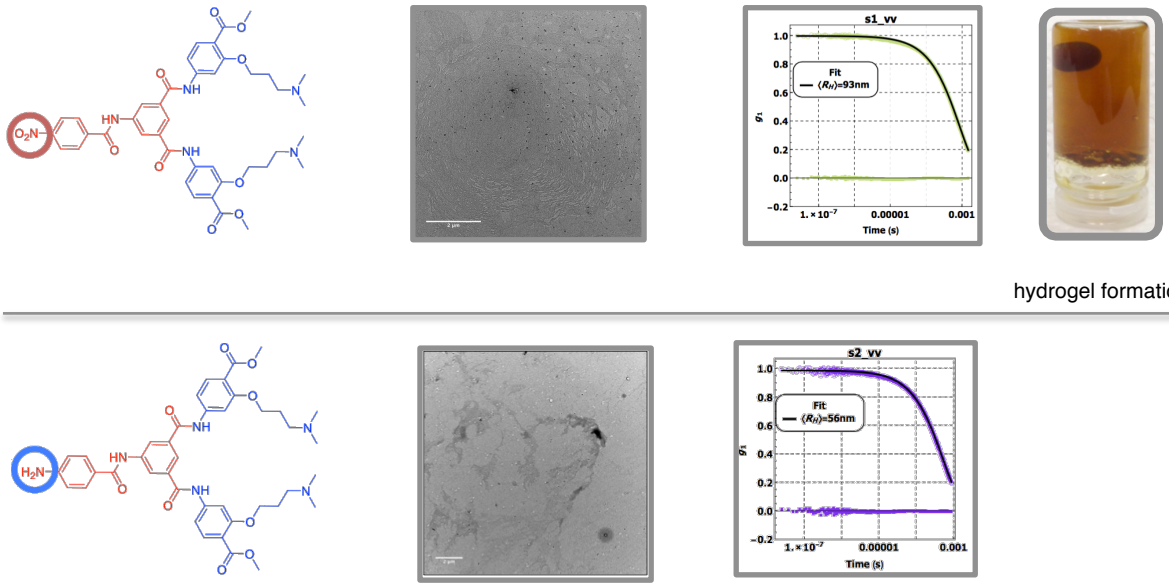

Figure 1 Oligomers showing different self-assembly: TEM images (scale bar 2μm) and DLS measurements

References

[1] Seyler, H.; Kilbinger, A. F. *Macromolecules* **2009**, *42*(22), 9141-9146.
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